



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,589	03/25/2004	Hiroyuki Arai	16359-006001 / 721/SM/toh	4607
26171	7590	09/11/2007	EXAMINER	
FISH & RICHARDSON P.C. P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			CHOW, YUK	
		ART. UNIT	PAPER NUMBER	
		2629		
		MAIL DATE	DELIVERY MODE	
		09/11/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/808,589	<b>Applicant(s)</b> ARAI ET AL.
	<b>Examiner</b> Yuk C. Chow	<b>Art Unit</b> 2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 06/28/2007.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 2,4,6-10 and 12-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 7 and 8 is/are allowed.
- 6) Claim(s) 2,4,6, 9,10,12-24 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date: _____
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>06/28/2007</u>	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____

**DETAILED ACTION**

***Response to Amendment***

1. Applicant's arguments filed on 06/28/2007 with respect to claims 2,4,6-10,12-24 have been considered but are moot in view of the new ground(s) of rejection.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4, 2, 9, 10, 12; 6, 13,14, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benton (US Patent 5,515,390) in view of Chow (US Patent 5,453,668).

As to claims 4 and 6, Benton discloses a driving circuit for a vacuum fluorescent display comprising an error detection circuit for VFD (Fig. 1), it generates an error warning (Fig. 1(7a)) when an incorrect electrode potential is detected (Col. 3 line 12-46).

However, Benton does not teach a counting unit configured to count the number of pulses per predetermined time period of a pulse voltage for pulse-driving a filament of the vacuum fluorescent display.

Chow discloses a circuitry for producing dynamic illumination of discharge lamp comprising a signal generator (Fig. 5(300)) configured to count the number of pulses per predetermined time period of a pulse voltage (Fig. 4B(RV) when detecting that the number of pulses per predetermined time period (Fig. 4A(T)), counted by the counting

Art Unit: 2629

unit (Fig. 5(510)), is equal to or less than the number of a reference pulse number (Fig. 7(706,708) see Col. 11 lines 48-57).

It would have been obvious to one of ordinary skill in the art at the time of invention was made to incorporate a counting unit of Chow into a driving circuit of Benton, because counting number pulse of a PWM signal in replacement of detecting threshold of a pulse voltage, is more accurate and cost effective (see Chow Col. 2 lines 12-18).

As to claim 2, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 4, wherein based on the detection signal, the driving circuit for a vacuum fluorescent display outputs a signal for notifying that level of the pulse voltage is fixed (Chow Fig. 4A(5V) see Col. 12 lines 33-54).

As to claim 9, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 4, wherein Benton further teaches the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit (Benton Fig. 4(4)); A filament pulse controlling unit (Benton Fig. 4(7)) configured to output a pulse-driving signal for pulse-driving the filament; and a terminal to which a switching element (Benton Fig. 4(4)) for generating the pulse voltage based on the pulse-driving signal, is externally connected (see Benton Col. 5 lines 19-46).

As to claim 10, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 4, wherein Benton further teaches a filament pulse controlling unit (Benton Fig. 4(7)) configured to output a pulse-driving signal for

Art Unit: 2629

pulse-driving the filament; a switching element (Benton Fig. 4(4)) for generating the pulse voltage based on the pulse-driving signal.

As to claim 12, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 4, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit further comprising: a filament pulse controlling unit (Benton Fig. 4(7)) configured to output a pulse-driving signal for pulse driving the filament; a switching element (Benton Fig. 4(4)) for generating the pulse voltage based on the pulse-driving signal.

As to claim 13, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 6, further comprising an integrating circuit for integrating the pulse voltage so as to produce the DC voltage (Benton Col. 3 lines 12-27).

As to claim 14, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 6, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, further comprising a terminal (Benton Fig. 4(4)) to which an integrating circuit for integrating the pulse voltage so as to produce the DC voltage, is operable to be connected (see Benton Col. 5 lines 19-46).

As to claim 21, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 6, wherein, based on the detection signal, the driving circuit for a vacuum fluorescent display output a signal (Benton Fig. 4(28)) for notifying the level of the pulse voltage is fixed (see Benton Col. 5 lines 48-65).

As to claim 22, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 6, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, further comprising: a filament pulse controlling unit (Benton Fig. 4(7)) configured to output a pulse-driving signal (Benton (Fig. 2) for pulse-driving the filament; and a terminal (Benton Fig. 4(4)) to which a switching element for generating the pulse voltage based on the pulse-driving signal, is operable to be externally connected (see Benton Col. 5 lines 19-46).

As to claim 23, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 6, further comprising: a filament pulse controlling unit (Benton Fig. 1(7)) configured to output a pulse-driving signal for pulse-driving the filament; and a switching element (Benton Fig. 1(4)) for generating the pulse voltage based on the pulse-driving signal (Benton Fig. 2).

As to claim 24, Benton and Chow disclose a driving circuit for a vacuum fluorescent display according to claim 6, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, further comprising: a filament pulse controlling unit (Benton Fig. 1(7)) configured to output a pulse-driving signal for pulse-driving the filament; and a switching element (Benton Fig. 1(4)) for generating the pulse voltage based on the pulse-driving signal (Benton Fig. 2).

3. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoekstra (US Patent 6,005,538) in view of Benton (US Patent 5,515,390).

As to claims 15-20, Hoekstra teaches a driving circuit for a vacuum fluorescent

Display comprising a filament driving unit (Fig. 3(50)), grid driving unit (Fig. 3(46)), a segment driving unit (Fig. 4(42)), a pulse driving a filament of VFD with a pulse voltage (Fig. 3), and DC voltage produced by integrating with pulse voltage (col. 3 line 40-col. 4 line 12)

However, Hoekstra's driving circuit does not teach a detection unit outputs a signal for notifying of an abnormal state of the pulse voltage.

Benton teaches an error detection circuit for electro-optic display including VFD. It generates an error warning (Fig. 1 (7a)) when an incorrect electrode potential is detected (col. 3 line 12-46).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate error detection circuit of Benton into VFD driving circuit of Hoekstra for ensuring the accuracy of the display. It would be essential for the operator to read the number correctly, because failed segments could go undetected and could be read as different number to reader. For example, if the center segment of a seven-segment display fails, the driving signal to display for producing the digital display of the number "8" becomes a "0".

#### ***Allowable Subject Matter***

Claims 7 and 8 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: None of cited references teaches the limitation of claimed invention having a selecting unit for selecting the output of pulse unit of the output of the level detecting unit and including all limitations in claim 7.

***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuk C. Chow whose telephone number is 571 270-1544. The examiner can normally be reached on 8-6 M-TH E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amare Mengistu can be reached on 571 272-7674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YC  
09/04/2007

  
AMARE MENGISTU  
SUPERVISORY PATENT EXAMINER